

AI-Powered Management Reporting and Executive Decision Intelligence Using SAP Analytics Cloud in Saudi Petrochemical Industries

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Abstract: Saudi petrochemical companies are operating in a complex environment that is shaped by volatile feedstock economics, global demand cycles, sustainability expectations, local-content commitments, and the industrial diversification priorities of Vision 2030. Traditional management reporting is often backward-looking, manually reconciled and disconnected from planning conversations, even if technically accurate. In this review we explore how artificial intelligence, augmented analytics and SAP Analytics Cloud can transform management reporting into executive decision intelligence for Saudi petrochemical industries. The paper employs a structured narrative review methodology of academic studies, SAP technical sources, Saudi industrial strategy documents and petrochemical reporting evidence published between 2020-2025. It provides an integrated context for enterprise data foundations, SAP Analytics Cloud features, predictive planning, natural-language insight, governance controls and executive decision routines. The review argues that dashboards alone do not create value, but a disciplined decision architecture where finance, operations, supply chain, sustainability and strategy leaders share trusted metrics and translate insight into timely action. This research provides a concrete synthesis for petrochemical executives, SAP transformation teams, and researchers working at the intersection of business intelligence, artificial intelligence, and industrial competitiveness in the Saudi sector.

Keywords: Artificial Intelligence, SAP Analytics Cloud, Management Reporting, Decision Intelligence, Petrochemical Industry, Saudi Vision 2030, Augmented Analytics, Executive dashboards.

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1. INTRODUCTION

The petrochemical industry is a vital driver of Saudi Arabia's industrial growth. It links hydrocarbon resources to higher-value chemicals, plastics, fertilisers, advanced materials and conversion industries and is central to the diversification ambitions of Vision 2030 and the National Industrial Development and Logistics Programme (Vision 2030, 2025; Invest Saudi, 2025).

Petrochemical companies are shifting from commodity volume to speciality products, circularity, lower-carbon operations and global joint ventures. Executives need reporting systems that can explain performance quickly, and support decisions in finance, production, logistics, sales and sustainability. The reporting challenge is not just about building dashboards. This is about stitching up the enterprise

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data silos into trusted, contextual and actionable decision intelligence.

Large industrial organisations extensively use SAP environments to combine the processes of finance, procurement, inventory, sales, maintenance and production planning and controlling. But management reporting in traditional ERP environments is often hampered by slow extraction cycles, spreadsheet reconciliations, inconsistent master data and limited forward-looking simulation. The reference paper on AI in SAP indicates similar opportunities for real-time data processing, predictive analytics, process automation and anomaly detection, but also points to challenges related to integration, security and change management (Jampani *et al.*, 2023). In petrochemical companies, these challenges are exacerbated by high asset intensity, volatile margins, complex product grades, long supply chains and regulatory pressures on safety and emissions.

A relevant answer can be found in SAP Analytics Cloud, which merges business intelligence, planning and predictive analytics in a cloud environment (SAP, 2025a; SAP Help Portal, 2025a). Augmented analytics capabilities can provide smart insights, predictive scenarios and natural language exploration, and integration with SAP S/4HANA, SAP Datasphere and SAP Business Technology Platform enables connecting operational and financial data without analytics being a separate layer (SAP Learning, 2023; SAP Help Portal, 2025b). As SAP Business AI and Joule come online, executive reporting can move from static performance views to conversational, explainable and workflow-connected decision support (SAP, 2025b; SAP News, 2024).

The aim of this review is to assess the potential of AI-enabled SAP Analytics Cloud to improve management reporting and executive decision intelligence in the Saudi petrochemical industries. The objectives are: first, to synthesise recent literature on AI, ERP analytics, decision support and augmented business intelligence; second, to examine the relevance of these capabilities to petrochemical reporting priorities under Vision 2030; third, to propose a sector-specific decision intelligence architecture; and fourth, to identify governance, adoption and value-realization conditions required for successful implementation.

2. REVIEW METHODOLOGY

This paper follows a structured narrative review design that is suitable for synthesising a fast-evolving technology and management topic. The objective is not to assess a single implementation as in an empirical survey, but to incorporate evidence taken from academic, technical and sectoral sources

into a practical conceptual framework. The review proceeded in four stages. The first stage was to develop the review question, which is: How can AI-enabled SAP Analytics Cloud transform management reporting into executive decision intelligence in Saudi petrochemical industries? The second stage found relevant evidence from 2020 to 2025, including peer-reviewed work on AI-enabled ERP, augmented analytics, business intelligence, decision support, management accounting and Industry 4.0, as well as SAP documentation and sources of Saudi industrial strategy. In the third stage, sources were screened for relevance to four themes: automated reporting, predictive planning, executive decision-making and governance. The fourth stage integrated findings into the dimensions of architecture, capability and implementation.

The review purposefully blends scholarly and practitioner sources because enterprise analytics transformation cannot be understood through academic publications alone. Functionality is described in product documentation, national priorities are discussed in official strategy reports, and industry context is provided in corporate reports. SAP sources are used to depict SAP Analytics Cloud as an integrated platform for BI, planning and predictive analytics, rather than independent proof of business impact (SAP Help Portal, 2025a; SAP, 2025a). The effect of AI, decision support systems and management accounting on decision processes in organisations was interpreted through academic studies (Soori *et al.*, 2024; Abbas, 2025; Kerr *et al.*, 2025). Saudi sources related the framework to industrial diversification, local content, petrochemicals and energy-industrial leadership priorities (Vision 2030, 2025; RDIA, 2024; SABIC, 2025a).

The inclusion criteria were English-language sources published between 2020 and 2025 and discussing AI-enabled analytics, ERP decision support, SAP Analytics Cloud, management accounting, executive reporting, petrochemical digital transformation or Saudi industrial strategy. We excluded sources older than 2020 unless they were used only as background. We also excluded promotional material without technical details and studies not related to enterprise reporting. Given the variety of methods used in the literature (including systematic reviews, product documentation, conceptual articles, annual reports and governance standards), this synthesis is based on thematic coding rather than statistical meta-analysis. The design is suitable for a review paper aiming to develop a practical executive framework with academic traceability.

3. Saudi Petrochemical Reporting Context

The Saudi petrochemical industry is not just a production segment; it is a national value chain platform. It connects feedstock, refining, chemicals, materials innovation, local manufacturing and export competitiveness. The Research, Development and Innovation Authority identify energy and industrial leadership as a national priority, including specialised petrochemicals, non-metallic products and crude-to-chemicals transformation (RDIA, 2024). Similarly, the National Industrial Strategy and NIDLP highlight advanced manufacturing, supply chain resilience and high-value industrial exports (Vision 2030, 2022; Vision 2030, 2025). These priorities set reporting requirements beyond monthly profit and loss statements. Executives need real-time visibility into margin contribution by product family, feedstock sensitivity, plant availability, demand shifts, customer profitability, logistics constraints, inventory ageing, cash conversion, local-content contribution and sustainability performance.

Saudi petrochemical and energy companies are already factoring in innovation, digitalisation and sustainability into their strategies, latest corporate reports show. SABIC states that its strategy is a response to transformation in the chemical industry and is aligned with Vision 2030 (SABIC, 2025b). Its integrated reporting focuses on local content, performance and sustainability value creation (SABIC, 2025a). Aramco's annual and sustainability reporting highlights downstream investments, expansion of petrochemical production, and the use of AI-driven analytics for emissions monitoring and predictive monitoring of critical equipment (Aramco, 2025a; Aramco, 2025b). These examples show that petrochemical management reporting should link financial and non-financial measures in a single executive narrative.

The significance of AI-supported reporting is increased by the operational features of the sector. Petrochemical margins are often volatile due to fluctuating energy prices, feedstock availability, product spreads, shipping costs, turnaround schedules and customer demand. A standard monthly dashboard may show what has already happened after the time to act has passed. Analytics powered by AI can help uncover the drivers of variance, identify patterns of exception and simulate alternative responses. For example, a management committee might need to understand whether a decline in EBITDA is caused by raw material costs, sales mix, plant yield, logistics demurrage, production downtime or currency exposure. This is where SAP Analytics Cloud has value, by bringing these variables into one business context, allowing executives to ask

better questions and evaluate scenarios before decisions are locked.

Governance also requires Saudi petrochemical companies to report on outcomes that contribute to the creation of national value. Local-content performance, supplier development, workforce capability and environmental efficiency are no longer peripheral measures. They affect license to operate, stakeholders confidence and alignment to Vision 2030. Executive decision intelligence must therefore connect traditional management reporting with national development outcomes. It needs common definitions, audited data lineage and a reporting culture that treats the analytics as a decision system, not a presentation exercise.

4. SAP Analytics Cloud and AI-Powered Management Reporting

SAP Analytics Cloud is an all-in-one cloud product for business intelligence, planning and predictive analytics (SAP Help Portal, 2025a). This combination is relevant in petrochemical management reporting as it bridges the gap between performance review and planning response. In many organisations, BI dashboards are used to explain actuals, while budgets and forecasts are managed in separate planning applications. But when AI features and predictive planning are integrated into the same environment, executives can go from observing a variance to testing the impact of corrective action. SAP's product materials focus on trusted AI, embedded business context, and the ability to move from insight to action with planning and predictive capabilities (SAP, 2025a; SAP Help Portal, 2025b).

AI-powered management reporting as analytics automate some of the cognitive work previously done by analysts. This includes spotting unusual movements, ranking drivers, creating narrative explanations, forecasting future results and recommending scenarios for review. The literature on augmented analytics describes this trend as a shift from manual data exploration to machine-assisted insight generation, especially for non-technical decision makers (Odogwu, 2023; Olszak, 2025). These features can support margin bridges, working-capital analysis, demand planning, production yield reviews, inventory risk, procurement variance and ESG performance in a petrochemical context.

SAP Analytics Cloud can support executive dashboards for the CEO, CFO, COO, supply chain leadership and sustainability committees. For the CEO, SAP Analytics Cloud can provide an enterprise-wide strategic view of overall business performance, profitability, operational resilience, investment priorities, sustainability progress, and Vision 2030

alignment. It can help the CEO monitor key executive KPIs across finance, operations, supply chain, and ESG, enabling faster decisions on growth, risk, competitiveness, and long-term value creation.

For the CFO, the value is in integrated profitability, cash-flow visibility, cost-to-serve analysis and forecast accuracy. For the COO, the platform can connect plant availability, quality losses, maintenance events and energy intensity. For commercial leaders this can link customer demand, price realisation, contract margins and product allocation. It can integrate emission indicators, energy performance, waste and circular economy measures for sustainability teams. This means the same data foundation can support different leadership views while keeping common definitions.

The integration challenge remains significant. AI-driven reporting relies on harmonised master data, data quality controls and semantic models that map technical ERP fields to business concepts. Without this foundation, dashboards can accelerate confusion instead of improving decisions. SAP Datasphere and BTP are relevant, as they can help to connect data sources, model business semantics and support governed integration across applications (SAP, 2025a; SAP Help Portal, 2025a). This means Saudi petrochemical companies need to integrate SAP S/4HANA financials, production systems, maintenance data, logistics, laboratory quality data, market indices and sustainability data into one management model.

A useful distinction is between automation of reporting vs decision intelligence. Automating the reporting process saves time in preparing standard reports. Decision intelligence enhances decision quality, speed and traceability. The AI-enabled SAP Analytics Cloud should therefore be built around repetitive executive decisions: pricing reviews, feedstock allocation, turnaround prioritisation, inventory release, customer profitability, capital expenditure, emissions-reduction investments and supplier localisation. This helps make the analytics design more focused, and executives can evaluate whether the system improves outcomes, rather than simply generates pretty pictures.

5. Executive Decision Intelligence Framework

Decision intelligence is the practice of combining data, models, human judgement and governance into a repeatable decision process. For SAP Analytics Cloud this means executive reporting should not be confined to a chart but should guide leaders through diagnosis, prediction, scenario comparison, decision approval and outcome tracking. AI can help identify trends that are difficult to identify manually, but it must not replace executive

accountability. Research on AI and strategic decision-making indicates that AI can accelerate and expand analysis, while human leaders are charged with deriving meaning from context, trade-offs, and organisational consequences (Csaszar *et al.*, 2024). Likewise, research on decision support in Industry 4.0 highlights the ability of AI tools to improve decision quality by being integrated into operational systems and governance routines (Soori *et al.*, 2024).

The proposed framework is composed of five layers. The first layer is the trusted data layer. This includes transactional ERP data, production data, supply chain data, market data, sustainability data and external indicators. The second layer is the semantic and governance layer where data definitions, ownership, security classifications, lineage and quality thresholds are specified. The third layer is the analytics and planning layer where SAP Analytics Cloud provides dashboards, planning models, predictive scenarios and automated narratives. The fourth layer is the executive decision layer where management committees review exceptions, compare scenarios and decide actions. The fifth layer is the learning layer in which the results are monitored and models are improved.

If the product margin falls below target, the system should not just show a red indicator. It should provide you with the feedstock cost, plant efficiency, price discounting, logistics delay, product mix, inventory write-down or customer behaviour. It should then show forecast impact under other actions such as adjusting production plans, revising sales allocation, renegotiating logistics capacity or changing procurement timing. The executives can approve a course of action, and the system can monitor whether the expected recovery is taking place. This closed loop structure is what separates business intelligence from decision intelligence.

Embedded governance is also a requirement of the framework. Risks may be introduced by biased models, hidden assumptions, poor quality data, unauthorised data access, and overreliance on automated recommendations from AI systems. The AI Risk Management Framework developed by NIST focuses on governance, mapping, measurement and management of AI risks (NIST, 2023). Responsible AI, ISO/IEC 42001 provides a management-system approach, and ISO/IEC 27001 remains relevant for information-security controls (ISO/IEC, 2023; ISO/IEC, 2022). For Saudi organisations, the requirements on personal data and national data governance also demand strict control over sensitive information (SDAIA, 2024). Hence, executive decision intelligence should include model documentation, explainability, approval workflows, access control and periodic audit.

The implication for leadership is clear. SAP Analytics Cloud is not just an IT tool. This has to be funded as an enterprise performance management programme. Finance, operations, supply chain, IT, digital transformation and internal audit should together define KPIs, scenarios and decision rights.

This cross-functional design is particularly critical in petrochemicals, where one decision can affect plant reliability, customer commitments, raw material balances, inventory, working capital and environmental targets. Shared ownership is key to effective decision intelligence.

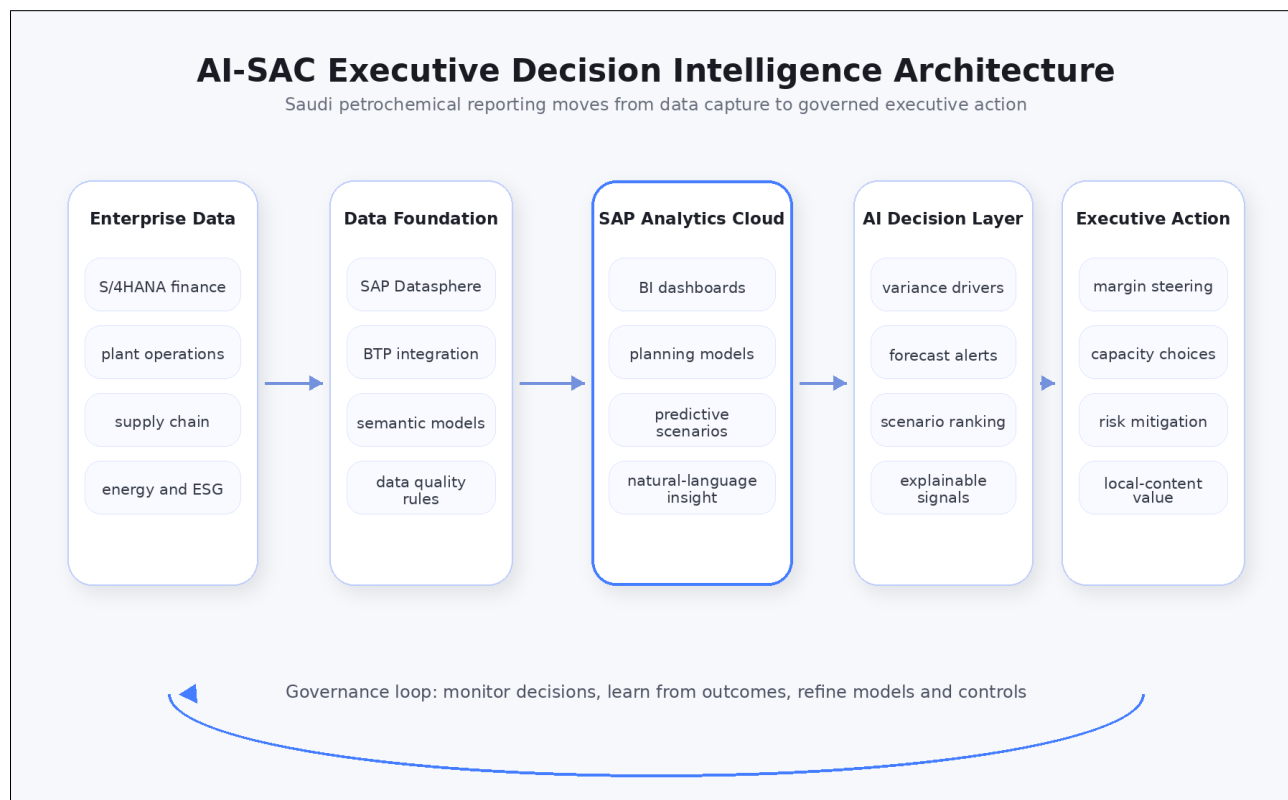


Figure 1: AI-SAC executive decision intelligence architecture for Saudi petrochemical reporting

6. Literature Review and Thematic Synthesis

Recent literature supports the argument that AI-enabled ERP and business intelligence systems can enhance forecasting, process automation, decision support, and governance. As a tool to process data in real time, to carry out predictive analytics, to automate workflows, to provide chatbot support, and to conduct predictive maintenance (Jampani *et al.*, 2023). Recent reviews of AI-enhanced ERP systems have highlighted benefits such as increased forecasting accuracy, inventory management, financial planning and real-time decision support, but also highlighted issues of implementation complexity and ethical issues (Jawad *et al.*, 2025). This is very similar to the reporting needs of the petrochemical industry, where executives require quick interpretation of operational and financial signals.

Business intelligence research has evolved from descriptive reporting to augmented analytics. Augmented analytics leverages machine learning, natural-language generation and automated insight discovery to assist users who might not have deep

technical skills (Odogwu, 2023). Olszak (2025) says that AI-enhanced BI facilitates future-oriented decision making by integrating data-driven insight and organisational performance management. These findings are important for executive reporting because top management usually doesn't need more data volume, it needs a clearer explanation of what matters, why it changed, and what action is available.

Research in management accounting also supports the relevance of AI for planning and control. AI can transform forecasting, management accounting work, performance analysis and professional roles, Abbas (2025) and Kerr *et al.*, (2025) talk about. Petrochemical companies. Management accountants and FP&A teams can leverage AI-supported SAP Analytics Cloud to cut down on manual consolidation and spend more time explaining performance drivers. This is not to remove human judgement, but to change the role to decision support, assumption challenge and scenario governance rather than report preparation.

The literature on Industry 4.0 and petrochemical digital transformation introduces an operational dimension. Decision support systems based on AI can link production, maintenance and quality data to managerial decision-making (Soori *et al.*, 2024). The digital transformation studies for the petrochemical sector show barriers such as legacy assets, data reliability, cybersecurity, investment constraints and resistance to change (Portillo, 2025). These barriers are highly relevant to SAP Analytics Cloud implementation, because executive dashboards are only as reliable as the integrated data and organisational routines behind them.

Five themes emerge from the literature. First, AI-driven reporting improves speed by cutting down manual data preparation. Second, it makes decisions more relevant by highlighting drivers and anomalies. Thirdly, it helps with forecasting and scenario planning, important in the volatile market conditions of the petrochemical industry. Fourth, it needs solid governance to handle data quality, privacy, model risk and cyber risk. Fifth, adoption is a function of workforce capability and leadership trust. These themes are the basis for the two tables and conceptual graphics presented in this paper.

Table 1: Evidence synthesis for AI-powered SAC reporting in Saudi petrochemical industries

Theme	2020-2025 evidence focus	Implication for SAP Analytics Cloud in Saudi petrochemicals
AI-enabled ERP	AI improves automation, forecasting, anomaly detection and decision support in ERP environments.	Connect S/4HANA data with SAC dashboards, predictive scenarios and executive alerts.
Augmented analytics	Machine learning and natural-language features reduce manual exploration and help non-technical users understand drivers.	Use smart insights, variance explanations and guided executive narratives.
Management accounting	AI changes FP&A from report preparation to scenario analysis, governance and advisory work.	Shift finance teams toward margin steering, cash forecasting and assumption challenge.
Industry 4.0 operations	Operational data and AI decision support improve maintenance, quality and production responsiveness.	Integrate plant, maintenance and production KPIs with financial outcomes.
Saudi industrial strategy	Vision 2030 prioritizes industrial competitiveness, high-value manufacturing and specialized petrochemicals.	Measure local-content value, export readiness, sustainability and downstream growth outcomes.

7. Implementation Model for Saudi Petrochemical Firms

Decision mapping should precede tool configuration during implementation. For a petrochemical company, it's all about understanding the executive decisions that generate the greatest value or risk. These could be monthly margin steering, sales and operations planning, feedstock optimisation, turnaround investment, customer profitability, inventory liquidation, emissions-reduction prioritisation and capital allocation. For each decision, organisation should define decision owner, decision frequency, required KPIs, data sources, model assumptions, approval workflow and outcome measures. This prevents the common pitfall of creating dashboards that are visually impressive but loosely connected to action.

Second step: data harmonisation. Petrochemical reporting is usually based on a lot of data domains SAP S/4HANA finance, materials management, sales and controlling plant historians and manufacturing execution systems lab information maintenance systems logistics data commodity price feeds sustainability data. These sources require common identifiers for products,

plants, customers, suppliers, cost centres and time periods. A semantic layer should convert operational data into executive language like contribution margin, yield loss, energy intensity, capacity utilisation, working capital exposure and local-content value. Without this layer, AI features can produce technically correct but commercially confusing insights.

Then comes the dashboard and the planning design. SAP Analytics Cloud stories should be about executive routines not departmental silos. At the board level, you could present strategic KPIs, while drill-down views allow leaders to look at product margins, plant performance, logistics risk or sustainability indicators. Planning models should allow for scenario comparison, including price sensitivity, demand shifts, feedstock cost changes, production constraints and capital expenditure options. At the outset, predictive features should be limited to high-value use cases where data quality is strong and model outputs can be validated.

Fourth step is governance of AI. The organisation should categorise AI-supported reports based on their risk level. Automation of commentary

for routine variance reporting could be considered a low-risk use case. Forecast alerts and anomaly detection can be medium-risk use cases. High risk use cases can include recommendations that influence pricing, production allocation, workforce planning, or capital investment. Each class needs controls on data access, model validation, human approval and audit trail. This is consistent with broader responsible AI guidance from NIST and ISO (NIST, 2023; ISO/IEC, 2023).

Step 5: Track adoption and value. Before executives and managers can depend on the system,

they must believe in it. Trust is earned through transparent definitions, explainable outputs, user training and visible correction of errors. A centre of excellence can store data definitions, model documentation, dashboard standards and user enablement. Value can be measured through shorter report cycle time, enhanced forecast accuracy, quicker decision approval, decreased inventory exposure, increased margin visibility, minimised manual reconciliation and stronger sustainability reporting. These measures make analytics transformation a business-performance programme.

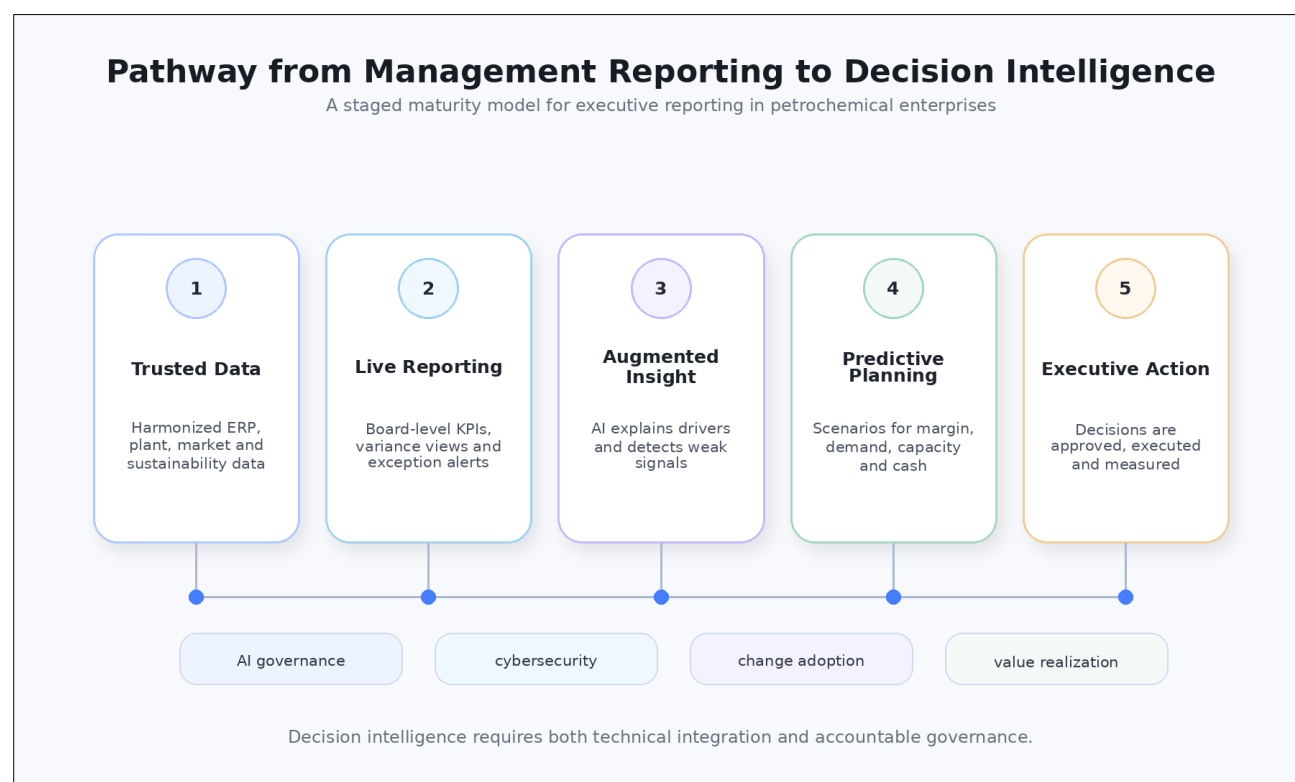


Figure 2: Maturity pathway from management reporting to executive decision intelligence

Table 2: Implementation and governance framework for SAP Analytics Cloud decision intelligence

Layer	Core capability	Executive KPI examples	Governance control
Trusted data	ERP, plant, market and ESG data harmonization	data completeness, reconciliation cycle, master-data accuracy	data ownership and lineage
Semantic model	business definitions for margin, yield, cost and sustainability	single source of truth, KPI consistency	approved KPI dictionary
SAC analytics	dashboards, smart insights, predictive planning	forecast accuracy, exception closure, report cycle time	role-based access and validation
Decision layer	scenario comparison and approval workflow	decision lead time, margin recovery, inventory reduction	human approval and audit trail
Learning loop	outcome tracking and model refinement	benefit realization, model drift, adoption rate	periodic model review

8. DISCUSSION

The review showed that AI-powered SAP Analytics Cloud can provide a lot of value to Saudi petrochemical industries when implemented as a

decision system. The value of the immediacy is the efficiency of reporting. Finance and controlling teams can reduce repetitive extraction, cleansing and presentation tasks but efficiency alone is not a good enough reason for investment. The larger value is in

improving executive judgement in the face of uncertainty. Petrochemical executives often have to make decisions with missing information, fluctuating prices and operating constraints. Decision intelligence can reduce uncertainty by illustrating the drivers, probabilities and consequences of alternative actions.

A second insight is that the petrochemical sector needs integrated performance narratives. The financial results are inseparable from plant reliability, logistics conditions, customer demand, product mix, emissions and local content. SAP Analytics Cloud is useful because it can combine analytics and planning, but the platform needs a data model that reflects the petrochemical business logic. Generic dashboards may not distinguish between commodity and speciality margins, the impact of planned shutdowns or the effect of grade changes on yield and inventory.

The third insight has to do with the role of AI in executive work. AI must be viewed as an analytical partner that speeds up diagnosis and scenario analysis. It should not be portrayed as an independent executive. In the petrochemical industry, leaders must balance customer relationships, regulatory obligations, safety imperatives, market reputation and national-development goals when making critical decisions. These factors can't be reduced to an algorithmic score. The best design is therefore human-centered: AI provides evidence, ranks signals and documents assumptions, while executives weigh trade-offs and remain accountable.

The fourth insight is the importance of governance. "Errors can quickly scale with the increased automation of reporting. Incorrect mapping of master-data, a biased forecast model or a poorly explained recommendation can impact major business decisions. Cyber security and data privacy are also relevant, as executive reporting systems may contain commercially sensitive pricing, customer, production, and financial data. Governance should therefore be integrated into the design, rather than added on afterwards.

The Saudi context, for instance, further strengthens the case for decision intelligence. Vision 2030 is concentrated on industrial competitiveness, innovation, localisation, and sustainable value creation. AI-enabled reporting allows petrochemical leaders to monitor these outcomes in a more integrated way. It can demonstrate how operational decisions impact not only short-term profit, but also energy efficiency, supplier development, workforce capability and downstream industrial value. In this sense, SAP Analytics Cloud is a potential enabler of

corporate performance as well as national industrial strategy.

9. Research Contribution and Implications

This review adds to research and practice in three ways. First, it bridges the general literature on AI-enabled ERP and augmented analytics with a specific industrial context, Saudi petrochemicals. Much of the existing writing concerns AI in ERP at a broad enterprise level, but petrochemical companies have specific reporting needs because of asset intensity, feedstock sensitivity, production complexity and sustainability expectations. Second, the paper separates management reporting from executive decision intelligence. This is an important distinction because many organisations invest in dashboards without redesigning decision routines. Third, the paper describes a layered implementation framework that combines the data foundation, SAP Analytics Cloud capabilities, AI insight, governance and value tracking.

For executives, the key takeaway is that analytics transformation should be business-driven. Leaders should be asking which decisions need to be made faster, explained better or become more predictive. For finance leaders, this means that FP&A teams need to evolve from report producers to decision partners, managing assumptions, scenarios and performance narratives. For CIOs and digital leaders this means that SAP Analytics Cloud needs integration architecture, semantic modelling, data quality and security controls. This means that for internal audit and risk functions the AI supported reporting must be auditable, explainable and controlled.

The paper suggests future empirical work for researchers. Case studies could look at implementation of SAP Analytics Cloud at Saudi petrochemical firms and measure impact on report cycle time, forecast accuracy, decision speed, working capital and executive satisfaction. Survey research could examine the association between augmented analytics trust and decision quality of finance and operations managers. Technical studies could consider linking SAP data models to plant historians, market data and sustainability platforms. For example, governance research may examine the influence of Saudi data regulations and responsible AI frameworks on executive analytics design.

This implies that for policy makers and stakeholders in industrial development, the capacity of digital reporting can support national competitiveness. As companies are able to better measure local content, energy efficiency, supply chain resilience and innovation outcomes, they can more closely align commercial decisions with Vision 2030.

Decision intelligence therefore plays a broader regional development role. It helps organisations link operational decisions to industrial value creation, workforce development and sustainable growth.

The proposed framework is not a panacea. Smaller firms will focus on specific capabilities, while large integrated producers will need enterprise data platforms and sophisticated governance. However, this framework is a practical starting point. It encourages organisations to build out AI-powered management reporting step-by-step, from trusted data and high-value decisions to predictive planning and conversational decision support as maturity increases.

This synthesis also underscores the significance of executive discipline, as advanced analytics only yield value when leaders define decisions, challenge assumptions, document approvals, review outcomes, and update planning logic when market, plant, customer, sustainability, or regulatory conditions change across Saudi petrochemical value chains maturity stewardship traceability resilience coordination accountability comparability transparency learning prioritisation integration calibration localisation optimisation reliability maturity stewardship transparency, comparability, accountability, coordination, resilience, traceability learning prioritisation integration calibration localisation optimisation reliability maturity stewardship comparison traceability accountability coordination transparency resilience learning prioritisation integration calibration localisation optimisation reliability maturity stewardship traceability resilience coordination accountability comparability transparency learning prioritisation integration calibration localisation optimisation reliability maturity stewardship traceability resilience coordination accountability comparability transparency.

10. CONCLUSION

AI-powered management reporting using SAP Analytics Cloud offers a strong opportunity for Saudi petrochemical industries to move from retrospective dashboards to executive decision intelligence. The sector's strategic importance under Vision 2030, combined with market volatility and sustainability pressures, requires reporting systems that are integrated, predictive, explainable and governed. This review shows that SAP Analytics Cloud can support this transition by combining BI, planning, predictive analytics and AI-assisted insight

within a broader SAP ecosystem. However, the value of the platform depends on data quality, semantic integration, decision mapping, governance and user adoption.

The paper proposes that Saudi petrochemical firms design reporting around recurring executive decisions, such as margin steering, production allocation, inventory risk, customer profitability, energy performance and capital investment. AI can enhance these decisions by detecting anomalies, explaining variance drivers, forecasting outcomes and enabling scenario comparison. Yet the most effective model remains human-centered: executives remain accountable while AI improves the evidence available to them.

The review also highlights that decision intelligence should serve both corporate and national-development objectives. By integrating financial, operational, sustainability and local-content indicators, SAP Analytics Cloud can help petrochemical leaders understand how daily decisions contribute to long-term industrial value. Future research should test the proposed framework through empirical case studies and maturity assessments within Saudi petrochemical organizations. For practitioners, the practical message is simple: start with trusted data, map analytics to decisions, govern AI responsibly and measure value continuously. When these conditions are met, SAP Analytics Cloud can become not only a reporting platform, but a strategic intelligence layer for Saudi petrochemical competitiveness.

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